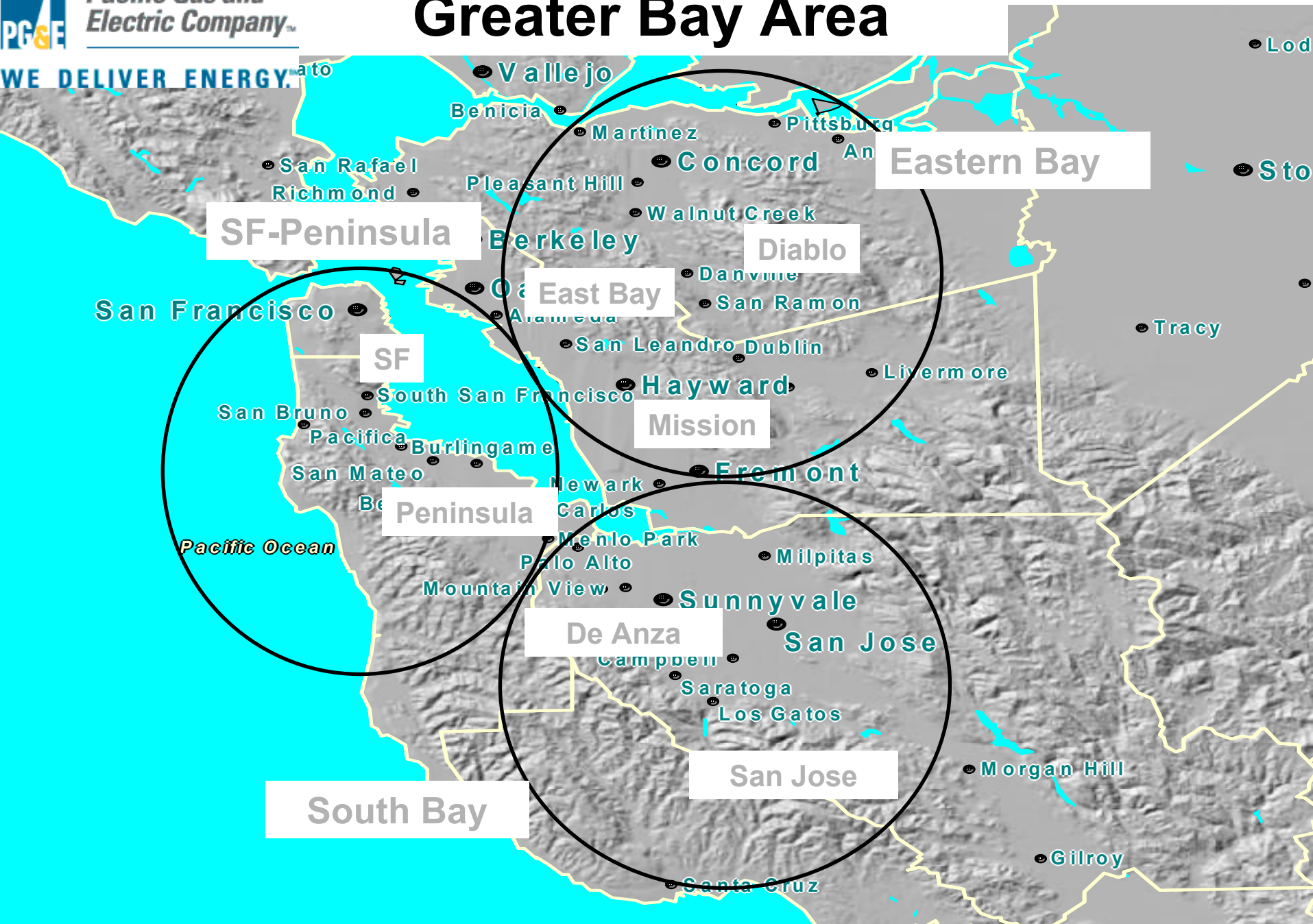


Greater Bay Area 2006 Assessment



Foung Mua and Kelly Dichoso
August 4, 2006

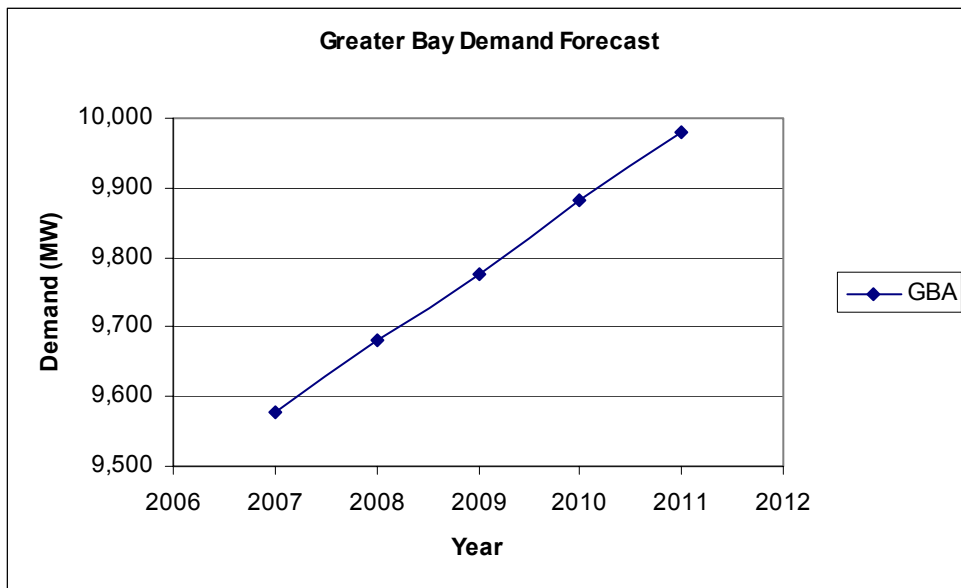
Greater Bay Area



2006 Greater Bay Area Assessment

- Five Year Assessments
 - ❖ Standard Five Year Planning Study
 - ❖ SF Bay Area Generation Planning Standard Study
 - ❖ Other Generation Sensitivities
 - New Generation (Level 2 units)
 - Potential Generation Retirements
- Ten Year Screening Assessments
- Bay Area LCR Analysis
 - ❖ Identify projected LCR Requirements for the Greater Bay Area and its sub-pockets.

Greater Bay Area Demand Forecasts



Area	2007 (MW)	2008 (MW)	2009 (MW)	2010 (MW)	2011 (MW)	Growth Rate (MW/Year)	Growth Rate (%/Year)
Greater Bay Area	9,579	9,680	9,777	9,882	9,981	100.5	1.0
San Francisco	932	944	952	961	973	10.3	1.1
Peninsula	998	1,101	1,018	1,027	1,037	9.8	1.0
East Bay	909	918	924	932	941	8.0	1.0
Diablo	1,745	1,770	1,788	1,810	1,835	22.5	1.3
Mission	1,332	1,343	1,351	1,375	1,386	13.5	1.3
De Anza	945	958	967	977	990	11.3	1.2
San Jose	1,720	1,742	1,758	1,781	1,796	19.0	1.1
Silicon Valley Power (SVP)	495	514	528	538	548	13.3	2.7

Transmission Projects

No	Project Title	PG&E Proj No.	Operational Date	Work Scope	CAISO Approved
1	Hunters Point – Potrero 115 kV Underground Cable	T744	In-Service 4/6/2006	Install underground Potrero – Hunters Point 115 kV Cable	Approved
2	Jefferson – Martin 230 kV Line	T082	In-Service 4/29/2006	Construct 230 kV transmission line from Jefferson to Martin Substation	Approved
3	Tri-Valley Long Term Project	T157	Sep 2006	Interconnect 230 kV substations	Approved
4	Dumbarton – Newark 115 kV Reconductoring	T846	Dec 2006	Reconductor Dumbarton – Newark 115 kV Line	Approved
5	Jefferson Bank Capacity – Transformer Work	T655	Dec 2006	Install second 230/60 kV transformer at Jefferson Substation	Approved
6	Bair – Belmont 115 kV Reconductoring	T081	May 2007	Reconductor Bair – Belmont 115 kV Line	Approved
7	Lone Tree Substation	T141	May 2007	Construct a new 230 kV substation	Approved
8	Metcalf – Monta Vista 230 kV Nos. 1 and 2 Reconductoring	T647A	May 2007	Reconductor Hicks – Metcalf and Vasona – Metcalf 230 kV Lines	Approved
9	Newark – Newark Distribution 230 kV Line	T944	May 2007	Reconductor the Newark – Newark Distribution 230 kV Line	Approved

Transmission Projects

No	Project Title	PG&E Proj No.	Operational Date	Work Scope	CAISO Approved
10	Bay Area Reactive - Ravenswood	T790B	Dec 2007	Install Shunt Capacitors at Ravenswood Substation	Approved
11	Martin – Hunters Point 115 kV Cable	T897	Dec 2007	Construct additional 115 kV Underground Cable	Approved
12	Metcalf – Moss Landing 230 kV Reinforcement	T867	Dec 2007	Reconductor Metcalf – Moss Landing 230 kV Nos. 1 and 2 Lines	Approved
13	Vaca Dixon 500/230 kV Transformer	T783B	Dec 2007	Install a second 500/230 kV transformer at Vaca Dixon	Approved
14	Metcalf – El Patio 115 kV Reconductoring	T694	May 2008	Reconductor Metcalf – El Patio 115 kV Lines	Approved
15	Monta Vista 115/60 kV Transformer	T776	May 2008	Install a 115/60 kV Transformer at Monta Vista Substation	Approved
16	Newark – Fremont 115 kV Reconductoring	T847	May 2008	Reconductor Newark – Fremont 115 kV Nos. 1 and 2 lines	Approved
17	Vaca Dixon – Contra Costa 230 kV Reinforcement	T972	May 2008	Reconductor the Vaca Dixon – Lambie and Vaca Dixon – Peabody 230 kV lines	Not Yet
18	Martin 115/60 kV Transformer Replacement	T980	Dec 2008	Replace the Martin 115/60 kV Transformer with a higher capacity unit or install a second unit	Not Yet

Transmission Projects

No	Project Title	PG&E Proj No.	Operational Date	Work Scope	CAISO Approved
19	Trans Bay Cable Project	N/A	2009	Install HVDC cable between Pittsburg and Potrero substation	Approved
20	Newark – Ravenswood 230 kV Reconductoring	T982	May 2009	Reconductor the Newark – Ravenswood 230 kV	Not Yet
21	South of San Mateo Capacity Increase	T920A	May 2009	Upgrade the transmission facilities between Ames, Ravenswood and San Mateo	Not Yet
22	Bay Meadows 4/0 Cu Line Reconductoring	T249	May 2010	Reconductor San Mateo – Bay Meadow 115 kV Nos. 1 and 2 lines	Approved
23	Contra Costa – Las Positas 230 kV Reconductoring	T772	May 2010	Reconductor Contra Costa – Las Positas 230 kV Line	Approved
24	Half Moon Bay Reactive Support	T979	May 2010	Install voltage support or construct new 60 kV lines into Half Moon Bay Area	Not Yet
25	Oakland Underground Cable Project	T983	May 2010	Construct an additional Oakland C- X 115 kV underground cable	Approved
26	Pittsburg – Tesla 230 kV Reconductoring	T984	May 2010	Reconductor both Pittsburg – Tesla 230 kV lines	Not Yet
27	Monta Vista – Los Altos 60 kV Reconductoring	T981	May 2011	Reconductor the limiting sections of the Monta Vista – Los Altos 60 kV Line	Not Yet

Transmission Projects

No	Project Title	PG&E Proj No.	Operational Date	Work Scope	CAISO Approved
28	Upgrade Tesla – Newark 230 kV Path	T670B	May 2011	Reconductor the limiting sections of the Tesla – Newark 230 kV No. 2 Line	Not Yet
29	Metcalf – Evergreen 115 kV Lines	T854	May 2012	Reconductor the Metcalf – Evergreen 115 kV Lines	Approved
30	Piercy – Metcalf, Swift – Metcalf, and Newark – Dixon Landing 115 kV Lines	T692	May 2012	Reconductor the Swift – Metcalf and Piercy – Metcalf 115 kV Lines	Approved
31	Bay Area 500 kV Station	T073	May 2013	Construct 500 kV facilities to serve customer growth in the Bay Area	Not Yet
32	Contra Costa 230 kV Reconductoring	T772A	May 2015	Reconductor the Lambie – Contra Costa and Peabody – Contra Costa 230 kV lines	Not Yet
33	San Francisco Underground Cable Replacement	T898A	May 2015	Replace the Potrero – Martin 115 kV UG cable with higher rated conductors	Not Needed
34	San Mateo and Moraga Synchronous Condenser Replacements	N/A	May 2015	Replace the San Mateo and Moraga synchronous condensers with newer facilities	Not Needed

Study Assumptions for Bay Area Assessment

- Summer Peaking Area
- Modeled CAISO Approved Transmission Projects
 - Trans Bay Cable Project is included in this assessment
- Generation
 - ❖ Hunters Point Power Plant Shut Down
 - ❖ Contra Costa Power Plant Unit 8
 - ❖ Russell City Energy Center
- Bay Area Generation Levels
 - ❖ 9,073 MW
- System Protection Scheme (SPS)
 - ❖ Metcalf 230 kV SPS
 - ❖ South of San Mateo SPS
 - ❖ Grant SPS

SF and Peninsula Assessment Summary

- Five Year Assessment
 - ❖ Normal voltage/thermal concerns – None
 - ❖ Emergency voltage/thermal concerns - Three
- Ten Year Screening Analysis
 - ❖ One
- Double Circuit Tower Line (DCTL) Analysis
 - ❖ Ravenswood – Palo Alto 115 kV Nos. 1 and 2 outage
 - ❖ Ravenswood – Palo Alto 115 kV No. 1 and Cooley Landing – Palo Alto 115 kV outage
 - ❖ Ravenswood – Bair 115 kV Nos. 1 and 2 outage

SF and Peninsula Assessment Results

No.	Transmission Facility	Facility Rating	2007	2008	2009	2010	2011	2016 Ten Year Screening	Contingency	Mitigation Plan
1	Cooley Landing 115/60 kV Transformer No. 1	SE Rating 100 MVA	103%	<95%	<95%	<95%	<95%	97%	Cooley Landing 115/60 kV Transformer No. 2 (T-1)	T776: Monta Vista 115/60 kV Transformer
2	Half Moon Bay	60 kV	0.90 pu	0.90 pu	0.90 pu	0.90 pu	0.90 pu	0.89 pu	Hillsdale Jct – Half Moon Bay 60 kV (L-1)	T979: Half Moon Bay Reactive Support
3	Martin 115/60 kV Transformer No. 6	SE Rating 48 MVA	<95%	95%	97%	98%	100%	106%		T772: Martin 115/60 kV Transformer Replacement
4	Jefferson – Hillsdale Jct 60 kV	SE Rating 597 Amps	103%	103%	<95%	<95%	<95%	<95%	Jefferson – Martin 230 kV overlapped with DEC offline (L-1/G-1) (Potrero Unit 3, 4, and Oakland CT 2 offline)	Open the normally closed Hillsdale Switch No. 97

South Bay Assessment Summary

- Five Year Assessment
 - ❖ Normal voltage/thermal concerns – One
 - ❖ Emergency voltage/thermal concerns - None
- Ten Year Screening Analysis
 - ❖ None
- Double Circuit Tower Line (DCTL) Analysis
 - ❖ None

South Bay Assessment Results

No.	Transmission Facility	Facility Rating	2007	2008	2009	2010	2011	2016 Ten Year Screening	Contingency	Mitigation Plan
1	Monta Vista – Los Altos 60 kV	SN Rating 443 Amps	<95%	102%	103%	105%	106%	113%	Normal	T981: Monta Vista – Los Altos 60 kV Reconductoring

Eastern Bay Assessment Summary

- Five Year Assessment
 - ❖ Normal voltage/thermal concerns – None
 - ❖ Emergency voltage/thermal concerns - Two
- Ten Year Screening Analysis
 - ❖ Two
- Double Circuit Tower Line (DCTL) Analysis
 - ❖ Moraga – Oakland J and Moraga – San Leandro 115 kV Outage
 - ❖ Moraga – San Leandro 115 kV Nos. 1 and 2 Outage
 - ❖ Moraga – San Leandro 115 kV and Moraga – Oakland J 115 kV outage
 - ❖ Lakewood – Clayton 115 kV and Lakewood – Meadow Lane – Clayton 115 kV outage
 - ❖ Pittsburg – Clayton 115 kV Nos. 3 and 4 outage

Eastern Bay Assessment Results

No.	Transmission Facility	Facility Rating	2007	2008	2009	2010	2011	2016 Ten Year Screening	Contingency	Mitigation Plan
1	Contra Costa – Moraga 230 kV Nos. 1 and 2	SE Rating 954 Amps	<95%	<95%	<95%	109%	110%	114%	Parallel line overlapped with DEC offline (L-1/G-1)	Line Rerate
2	Herdlyn 70/60 kV Transformer	SE Rating 60 MVA	103%	103%	104%	104%	105%	108%	Las Positas – Vasco 60 kV overlapped with Altamont Cogen offline (L-1/G-1)	TBD
3	Contra Contra – Las Positas 230 kV	SE Rating 999 Amps	<95%	<95%	<95%	98%	98%	101%	Contra Costa – Lone Tree 230 kV overlapped with MEC offline (L-1/G-1)	T772: Contra Costa – Las Positas 230 kV Reconductoring
4	San Leandro – Oakland J 115 kV	SE Rating 904 Amps	<95%	<95%	<95%	<95%	95%	101%	Moraga – Oakland J 115 kV (L-1)	TBD

Greater Bay Area Generation Assessment Summary

- New Generation Sensitivities
 - ❖ Year Studied: 2011
 - ❖ Units Studied In-Service:
 - East Altamont EC
 - Tesla Power Plant
 - Tesla PP and East Altamont EC
- Generation Retirement Sensitivities
 - ❖ Years Studied: 2011
 - ❖ Studied Three Scenarios

New Generation Sensitivity Results

- No thermal/voltage concerns identified for the new generation sensitivity studies.

Bay Area Generation Retirement Scenarios

Scenario	Generation Units Unavailable	Capacity (MW)	New Gen Units	Capacity Added
1	Contra Costa 4-7, Pittsburg 5-7, Moss Landing 6&7, Morro Bay 3&4, Potrero 3	4,397	0	0
2	Contra Costa 6, Pittsburg 7, Potrero 3	1,247	0	0
3	Contra Costa 4-7, Pittsburg 5-7, Moss Landing 6&7, Morro Bay 3&4, Potrero 3	4,397	Tesla and East Altamont	1,797

Generation Retirement Sensitivity Results

No.	Transmission Facility	Facility Rating	2011	Contingency
Scenario 1: Contra Costa PP Units 4-7, Morro Bay 3 and 4, Moss Landing Unit 6 and 7, Pittsburg PP Units 5-7, and Potrero Unit 3 Retired				
1	Pittsburg – Tesla 230 kV Nos. 1 and 2	SE Rating 1,162 Amps	100%	Parallel Line overlapped with DEC offline (L-1/G-1)
2	Moraga 230/115 kV Transformer Nos. 1 and 2	SE Rating 161 MVA	110%	Moraga 230/115 kV Transformer No. 3 (T-1)
Scenario 2: Contra Costa Unit 6, Pittsburg Unit 7 and Potrero Unit 3 Retired				
1	Moraga 230/115 kV Transformer Nos. 1 and 2	SE Rating 161 MVA	98%	Moraga 230/115 kV Transformer No. 3 (T-1)
Scenario 3: Contra Costa PP Units 4-7, Morro Bay 3 and 4, Moss Landing Unit 6 and 7, Pittsburg PP Units 5-7, and Potrero Unit 3 Retired. Tesla PP and East Altamont EC Online.				
1	Pittsburg – Tesla 230 kV Nos. 1 and 2	SE Rating 1,162 Amps	98%	Parallel Line overlapped with DEC offline (L-1/G-1)
2	Moraga 230/115 kV Transformer Nos. 1 and 2	SE Rating 161 MVA	112%	Moraga 230/115 kV Transformer No. 3 (T-1)

Next Step(s)...

- Develop mitigation plans
- Present LCR results next stakeholder meeting